

RF EXPOSURE EVALUATION

According to FCC 1.1310 and KDB 447498 D01 V06, The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Average RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 * P * G}{377 * D^2}$$

From the EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

Measurement Result

BT:

Operation Frequency: 2402MHz~2480MHz

Power density limited: 1mW/ cm²

Antenna Type: FPC Antenna

Antenna gain: 3.5 dBi;

R=20cm

mW=10^{^(dBm/10)}

antenna gain Numeric=10^{^(dBi/10)}

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain		(mW/cm2)	(mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
2402	DH5	4.73	4±1	5	3.162	3.50	2.24	0.0014	1
2441		4.62	4±1	5	3.162	3.50	2.24	0.0014	1
2480		4.67	4±1	5	3.162	3.50	2.24	0.0014	1
2402	2DH5	4.96	5±1	6	3.981	3.50	2.24	0.0018	1
2441		6.48	6±1	7	5.012	3.50	2.24	0.0022	1
2480		6.64	6±1	7	5.012	3.50	2.24	0.0022	1
2402	3DH5	5.35	5±1	6	3.981	3.50	2.24	0.0018	1
2441		5.11	5±1	6	3.981	3.50	2.24	0.0018	1
2480		5.12	5±1	6	3.981	3.50	2.24	0.0018	1

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain		(mW/cm2)	(mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
2402	BLE 1M	5.31	5±1	6	3.981	3.50	2.24	0.0018	1
2440		5.05	5±1	6	3.981	3.50	2.24	0.0018	1
2480		5.01	5±1	6	3.981	3.50	2.24	0.0018	1

2.4G WIFI

Operation Frequency:

WIFI 802.11b/g/n HT20: 2412-2462MHz,

WIFI 802.11n HT40:2422-2452MHz

Power density limited: 1mW/ cm²

Antenna Type: FPC Antenna

Antenna 0 gain/Antenna 1 gain: 2.82 dBi;

R=20cm

mW=10^{^(dBm/10)}

Antenna gain Numeric=10^{^(dBi/10)}

Antenna	Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
			(dBm)		tune-up power		Gain		(mW/cm2)	(mW/cm2)
					(dBm)	(mW)	(dBi)	Numeric		
Ant 1	2412		16	15±1	16	39.811	2.82	1.91	0.0152	1
Ant 1	2437		15.15	15±1	16	39.811	2.82	1.91	0.0152	1
Ant 1	2462		14.19	15±1	16	39.811	2.82	1.91	0.0152	1
Ant 1	2412		11.56	11±1	12	15.849	2.82	1.91	0.0060	1
Ant 1	2437		11.25	11±1	12	15.849	2.82	1.91	0.0060	1
Ant 1	2462		10.48	11±1	12	15.849	2.82	1.91	0.0060	1
Ant 1	2412	802.11n H20	11.84	11±1	12	15.849	2.82	1.91	0.0060	1
Ant 1	2437		11.23	11±1	12	15.849	2.82	1.91	0.0060	1
Ant 1	2462		10.89	11±1	12	15.849	2.82	1.91	0.0060	1
Ant 1	2422	802.11n H40	10.21	10±1	11	12.589	2.82	1.91	0.0048	1
Ant 1	2437		10.22	10±1	11	12.589	2.82	1.91	0.0048	1
Ant 1	2452		9.8	10±1	11	12.589	2.82	1.91	0.0048	1

5G WIFI

802.11a/n20/ac20: 5180-5240MHz , 5745-5825MHz

802.11n/ac40:5190-5230MHz, 5755-5795MHz

802.11ac80:5210MHz, 5775MHz

Power density limited: 1mW/cm

Antenna Type: FPC Antenna

Antenna Gain:

5.2G

Antenna: 4.25 dBi;

5.8G

Antenna: 4.27 dBi

R=20cm

$mW=10^{(dBm/10)}$

antenna 1gain Numeric= $10^{(dBi/10)}$

5.2G

Antenna	Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
			(dBm)		tune-up power		Gain			
					(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
Ant1	5180	802.11a	14.42	14±1	15	31.623	4.25	2.66	0.0167	1
Ant1	5200		14.38	14±1	15	31.623	4.25	2.66	0.0167	1
Ant1	5240		14.72	14±1	15	31.623	4.25	2.66	0.0167	1
Ant1	5180	802.11n H20	14.02	14±1	15	31.623	4.25	2.66	0.0167	1
Ant1	5200		14.20	14±1	15	31.623	4.25	2.66	0.0167	1
Ant1	5240		14.80	14±1	15	31.623	4.25	2.66	0.0167	1
Ant1	5190	802.11n H40	11.52	12±1	13	19.953	4.25	2.66	0.0106	1
Ant1	5230		12.06	12±1	13	19.953	4.25	2.66	0.0106	1
Ant1	5180	802.11ac20	14.28	14±1	15	31.623	4.25	2.66	0.0167	1
Ant1	5200		14.28	14±1	15	31.623	4.25	2.66	0.0167	1
Ant1	5240		14.83	14±1	15	31.623	4.25	2.66	0.0167	1
Ant1	5190	802.11ac40	11.60	12±1	13	19.953	4.25	2.66	0.0106	1
Ant1	5230		12.20	12±1	13	19.953	4.25	2.66	0.0106	1
Ant1	5210	802.11ac80	9.32	9±1	10	10.000	4.25	2.66	0.0053	1

5.8G

Antenna	Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density limits
			(dBm)		tune-up power		Gain		(mW/cm2)	(mW/cm2)
					(dBm)	(mW)	(dBi)	Numeric		
Ant1	5745		15.95	16±1	17	50.119	4.27	2.67	0.0267	1
Ant1	5785		16.13	16±1	17	50.119	4.27	2.67	0.0267	1
Ant1	5825		15.65	16±1	17	50.119	4.27	2.67	0.0267	1
Ant1	5745	802.11n H20	15.78	16±1	17	50.119	4.27	2.67	0.0267	1
Ant1	5785		16.12	16±1	17	50.119	4.27	2.67	0.0267	1
Ant1	5825		15.70	16±1	17	50.119	4.27	2.67	0.0267	1
Ant1	5755	802.11n H40	16.48	16±1	17	50.119	4.27	2.67	0.0267	1
Ant1	5795		16.66	16±1	17	50.119	4.27	2.67	0.0267	1
Ant1	5745	802.11ac20	15.84	16±1	17	50.119	4.27	2.67	0.0267	1
Ant1	5785		16.14	16±1	17	50.119	4.27	2.67	0.0267	1
Ant1	5825		15.65	16±1	17	50.119	4.27	2.67	0.0267	1
Ant1	5755	802.11ac40	16.34	16±1	17	50.119	4.27	2.67	0.0267	1
Ant1	5795		16.62	16±1	17	50.119	4.27	2.67	0.0267	1
Ant1	5775	802.11ac80	16.83	16±1	17	50.119	4.27	2.67	0.0267	1

SIMULTANEOUS TRANSMISSIONS

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE. To comply with the MPE, the fraction of the MPE in terms of E^2 , H^2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity. In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^n \frac{S_i}{MPE_i} \leq 1$$

Worst case is Simultaneous Transmissions for 5.8G Wi-Fi +BT

Band	Mode	Standalone	Standalone	Simultaneous		Verdict
		Evaluation result	Power density Limits	Evaluation result	Limit	
		(mW/cm2)	(mW/cm2)	raio		
5.6G Wi-Fi+BT	BT	0.0022	1	0.0289	1	PASS
	5.8G WIFI	0.0267	1			

Conclusion:

For the max result : $0.0289 \leq 1.0$, SAR is not required.

Signature:

Date: 2026-03-20



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